Journal of the American College of Cardiology
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Published by Elsevier Inc.

Vol. 58, No. 20, 2011
ISSN 0735-1097/$36.00
doi:10.1016/j.jacc.2011.02.081

IMAGES IN CARDIOLOGY

Persistent Left Superior Vena Cava With Retrograde Drainage From the Left Atrium Into the Left Brachiocephalic Vein

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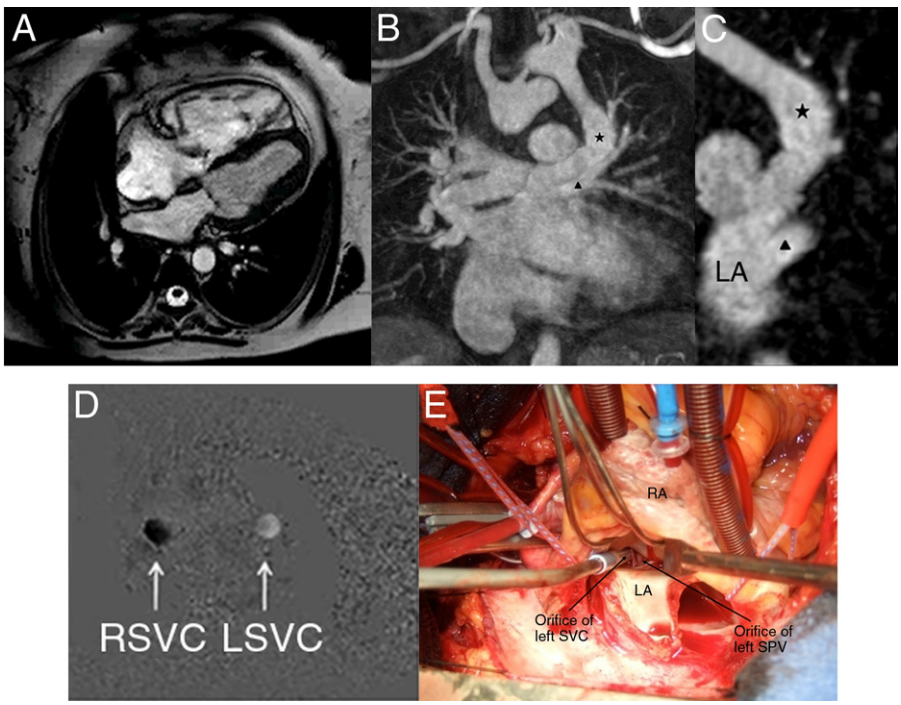

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Manuscript received January 31, 2011; accepted February 10, 2011.

A 61-year-old female with no cardiac history presented with progressive right heart failure. Severe aortic stenosis, moderate mitral stenosis, and a markedly dilated right ventricle were found on transthoracic echocardiography and confirmed by cardiovascular magnetic resonance (CMR) imaging (**A**, Online Video 1). Phase-contrast imaging revealed a left-to-right shunt ratio of 2.4. Contrast-enhanced 3-dimensional MR angiography demonstrated an anomalous vein in the left hemithorax connecting the left brachiocephalic vein to the left atrium (**B and C**, Online Video 2). Time-resolved MR angiography (Online Video 3) and phase-contrast imaging **(D)** showed blood in this anomalous vein to flow cranially. Flow in this rare type of left superior vena cava is usually cranial-to-caudal and is associated with an unroofed coronary sinus. Our patient had otherwise normal anatomy; the flow was reversed due to elevated left atrial pressure secondary to significant mitral and aortic stenosis. The findings were confirmed at valve surgery (**E**, Online Video 4), during which the anomalous vessel was also ligated. LA = left atrium; RA = right atrium; SPV = superior pulmonary vein; SVC = superior vena cava. **Asterisk** = left SVC; **triangle** = SPV.